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SPECIFICATION FOR SUGARCANE HARVESTING KNIFE

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Indian Standard

SPECIFICATION FOR SUGARCANE HARVESTING KNIFE

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(*Continued on page* 2)

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Indian Standard

SPECIFICATION FOR SUGARCANE HARVESTING KNIFE

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 25 February 1985, after the draft finalized by the Harvesting and Threshing Equipment Sectional Committee had been approved by the Agricultural and Food Products Division Council.

0.2 After the standing sugar cane crop is harvested, the farmer generally take 2-3 ratoons. One of the prerequisites for taking good ratoon is that the harvesting of previous crop shall be done close at ground level or stubble shaving shall be done at a latter stage. The sugarcane is, therefore, required to be cut clean and close to the ground level without splitting of the stubbles buried in the ground. Sugarcane harvesting knives are generally used for harvesting of sugarcane, preferably close at ground level. Depending upon the type of harvesting knife, it could also be used for preparation of sugarcane sets for planting.

0.3 There are different shapes and sizes of harvesting knives popular in different parts of the country. They are basically of two types, one having straight blade of different sizes and thicknesses having straight handle and another with comparatively long handle and blade fixed at an angle. In the case of former, several shapes are available in different parts of the country. A need was felt to prepare an Indian Standard stipulating various quality parameters of the knife.

0.4 The figure given in this standard is only to serve as an illustration and should not be considered as suggestive of any standard design.

0.5 In preparation of this standard, assistance has been derived from the Central Institute of Agricultural Engineering (ICAR), Bhopal.

0.6 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

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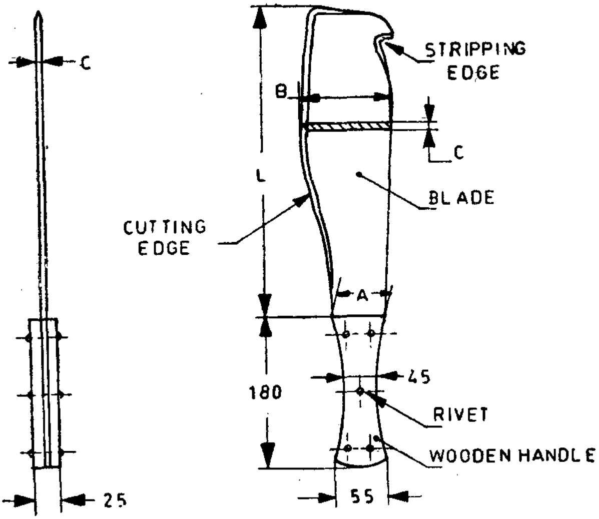
*Rules for rounding off numerical values (*revised*).

1. SCOPE

1.1 This standard covers the requirement for plain blade sugarcane harvesting knife which would also be used for making sugarcane sets for planting.

2. TERMINOLOGY

2.0 For the purpose of this standard, the following definitions shall apply (*see also* Fig. 1).



All dimensions in millimetres.

FIG. 1 SUGARCANE HARVESTING KNIFE

2.1 Blade — The main metallic part of the harvesting knife.

2.1.1 *Cutting Edge* — The plain sharp edge on the inner side of the blade.

2.1.2 *Stripping Edge* — The curved edge provided at the top end on the outer side of the blade, for stripping of dry and green leaves from sugarcane.

2.2 Handle — Two wooden pieces fitted at the bottom side of the blade with rivets and is used for holding the knife in the hand.

2.3 Size — The length of the blade (*see* L in Fig. 1).

3. MATERIAL

3.1 Blade — The blade shall be manufactured from carbon steel, alloy steel or tool steel.

3.1.1 The chemical composition of the carbon steel shall be as follows:

- a) Carbon 0·7 to 0·9 percent;
- b) Manganese 0·5 to 0·9 percent;
- c) Sulphur 0·05 percent, *Max*; and
- d) Phosphorus 0·05 percent, *Max*.

3.1.1.1 Some of the typical carbon steels that may be used are: C75, C80 and C85 grades [*see* IS : 1570 (Part 2)-1979[*]].

3.1.2 Alloy steel preferably conforming to the grade 16NiCr2 $\mathrm{M_o}$20, 37 Si2$\mathrm{M_n}$90 or 37$\mathrm{M_n}$2 of IS : 4367-1967[†] may be used.

3.1.3 Tool steel preferably conforming to the grade T75 or T85 of IS : 4367-1967[†] may be used.

3.2 Handle — Timber (*see* Appendix D of IS : 620-1975[‡]) or PVC (*see* IS : 7328-1974[§]) shall be used.

3.3 Rivets — Mild steel (*see* IS : 226-1975[||]) shall be used.

4. HARDNESS

4.1 The blade of the knife shall be heat-treated to give a hardness within the range of 400 to 475 *HB* (*see* IS : 1500-1983[¶]).

4.1.1 The hardness shall be tested at a point 10 mm away from the cutting edge and at least three places along the blade length.

5. DIMENSIONS

5.1 The critical dimensions of the knife, when read in conjunction with Fig. 1, shall be as given in Table 1.

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[*] Schedules for wrought steel for general engineering purposes: Part 2 Carbon steel (unalloyed steels) (*first revision*).

[†] Specification for alloy and tool steel forgings for general industrial use.

[‡] General requirements for wooden tool handles (*third revision*).

[§] Specification for high density polyethylene materials for moulding and extrusion.

[||] Specification for structural steel (standard quality) (*fifth revision*).

[¶] Method for Brinell hardness test for metallic materials (*second revision*).

TABLE 1 DIMENSIONS OF KNIFE

(*Clause* 5.1)

All dimensions in millimetres.

SL No.	*L* ±5	*A* ±2	*B* ±3	*C* ±0·5
(1)	(2)	(3)	(4)	(5)
i)	300	45	100	1·5
ii)	380	45	100	2·0
iii)	425	50	120	3·0

5.2 The diameter of the rivet shall be 5·0 mm.

5.3 Other dimensions given in Fig. 1 are for guidance only.

6. OTHER REQUIREMENTS

6.1 The blade shall be forged and cutting edge shall be sharpened.

6.2 The bottom portion of the blade shall be covered by two pieces of handle. The handles and the blade portion shall be rigidly attached by means of 5 rivets. The heads of the rivets shall be finished flush with the handle on both the sides.

7. TEST

7.1 The cutting edge of the knife shall be tested by striking not less than 12 drops from a height of 75 cm on a suitably shaped hard wood block made of *BABUL*, *SAL*, *TEAK*, *BIUASAL* or *HALDU*. At the end of the drops, the edge shall not show any sign of deformation.

8. WORKMANSHIP AND FINISH

8.1 The blade shall be free from cracks, seams, pits, burrs and other usual defects.

8.2 The handle shall be smooth with suitable grip.

8.3 The exposed metallic part shall be coated with oil or grease for prevention of rust. The wooden handle shall be polished or lacquered.

9. MARKING AND PACKING

9.1 Marking — Each knife shall be marked with the following particulars:

a) Manufacturer's name and/or recognized trade-mark;

b) Batch, code or serial number; and

c) Size.

9.1.1 Each knife may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

9.2 Packing — The knife shall be packed, as agreed to between the purchaser and the supplier, for safe handling in transit.

10. SAMPLING FOR LOT ACCEPTANCE

10.1 Unless otherwise agreed to between the purchaser and the supplier, the sampling and criteria for conformity of the harvesting knife for lot acceptance shall be done in accordance with **3** of IS : 7201-1974*.

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*Methods of sampling of agricultural machinery and tractors.

INTERNATIONAL SYSTEM OF UNITS (SI UNITS)

Base Units

QUANTITY	UNIT	SYMBOL
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

Supplementary Units

QUANTITY	UNIT	SYMBOL
Plane angle	radian	rad
Solid angle	steradian	sr

Derived Units

QUANTITY	UNIT	SYMBOL	DEFINITION
Force	newton	N	1 N = 1 kg.m/s^2
Energy	joule	J	1 J = 1 N.m
Power	watt	W	1 W = 1 J/s
Flux	weber	Wb	1 Wb = 1 V.s
Flux density	tesla	T	1 T = 1 Wb/m^2
Frequency	hertz	Hz	1 Hz = 1 c/s (s^{-1})
Electric conductance	siemens	S	1 S = 1 A/V
Electromotive force	volt	V	1 V = 1 W/A
Pressure, stress	pascal	Pa	1 Pa = 1 N/m^2